REMARKS

The Office Action dated June 17, 2005 has been carefully reviewed and the foregoing amendment and following remarks have been made in consequence thereof.

Claims 1-30 are pending in this application. Claims 1-6 and 27-30 are allowed. Claims 7-9, 12, 13, 116, 20, 21, and 24-26 stand rejected. Claims 10, 11, 14, 15, 17-19, 22, and 23 are objected to.

The rejection of Claims 12 and 20 under 35 U.S.C. § 102(b) as being anticipated by Stafford et al. (U.S. Patent No. 5,531,550) "Stafford" is respectfully traversed.

Stafford describes a method of computer-aided analysis of an analog image to determine the presence of anomalies therein. the analog image is raster-scanned and digitized by a digitizing apparatus, such as a scanning laser digitizer. In applications where an image exists in a digital format, such as PET scans, CAT scans, MRIs and sonograms, scanning to digitize the image is not required. The method includes dividing the image into a plurality of m X n regions, for each of the regions, selecting a smaller p X q subregion, feeding the p X q subregions into a neural network system having plural member neural networks trained to recognize a particular preselected anomaly type, comparing each output value of the plurality of member neural networks to a threshold above which the presence of an anomaly is indicated, and storing the result, clustering a plurality of the stored results to form clusters, and marking the location of the clusters.

Claim 12 recites a Computed Tomography system including "an x-ray source…an x-ray detector…and a computer operationally coupled to said x-ray source and said detector, said computer configured to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a first CT scan of an object."

Stafford does not describe nor suggest a Computed Tomography system as recited in Claim 12. Specifically, Stafford does not describe nor suggest a computer configured to

execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a first CT scan of an object. Rather, in contrast to the present invention, Stafford describes a method of computer-aided analysis of a raster-scanned and digitized analog image or an image pre-existing in a digital format, such as PET scans, CAT scans, MRIs and sonograms to recognize a particular preselected anomaly type. Accordingly, and for at least the reasons set forth above, Claim 12 is submitted to be patentable over Stafford.

Claim 20 recites a "computer readable medium encoded with a program configured to instruct a computer to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a CT scan of an object."

Stafford does not describe nor suggest computer readable medium encoded with a program configured to instruct a computer to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a CT scan of an object as recited in Claim 20. Specifically, Stafford does not describe nor suggest executing a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a CT scan of an object. Rather, in contrast to the present invention, Stafford describes a method of computer-aided analysis of a raster-scanned and digitized analog image or an image pre-existing in a digital format, such as PET scans, CAT scans, MRIs and sonograms to recognize a particular preselected anomaly type. Accordingly, and for at least the reasons set forth above, Claim 20 is submitted to be patentable over Stafford.

For at least the reasons above, Applicants respectfully request the § 102 rejection of Claims 12 and 20 be withdrawn.

The rejection of Claims 12 and 20 under 35 U.S.C. § 102(b) as being anticipated by Paik et al. (U.S. Patent Application No. 2002/0164061) "Paik" is respectfully traversed.

Paik describes a method for automatically detecting shapes in a medical image. The medical images are digital or computerized images such as, a CT, an MRI, a digitized X-ray,

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or any other medical image application that could be converted or rendered to a digital image. Normals to a surface intersect or nearly intersect with neighboring normals depending on the curvature features of the surface. The method first locates a surface in a medical image after which normal vectors are generated to the located surface. Then the method identifies at least one intersection and/or near intersection of the normal vectors wherein the number of intersections identifies shapes such as potential malignant candidates.

Claim 12 recites a Computed Tomography system including "an x-ray source…an x-ray detector…and a computer operationally coupled to said x-ray source and said detector, said computer configured to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a first CT scan of an object."

Paik does not describe nor suggest a Computed Tomography system as recited in Claim 12. Specifically, Paik does not describe nor suggest a computer configured to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a first CT scan of an object. Rather, in contrast to the present invention, Paik describes a method of identifying shapes from intersections of vectors that are generated to be normal to the shape surface and that indicate potential malignant candidates by analysis of a digital or computerized image such as a CT, an MRI, a digitized X-ray, or any other medical image application that could be converted or rendered to a digital image. Accordingly, and for at least the reasons set forth above, Claim 12 is submitted to be patentable over Paik.

Claim 20 recites a "computer readable medium encoded with a program configured to instruct a computer to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a CT scan of an object."

Paik does not describe nor suggest computer readable medium encoded with a program configured to instruct a computer to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from

a CT scan of an object as recited in Claim 20. Specifically, Paik does not describe nor suggest executing a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a CT scan of an object. Rather, in contrast to the present invention, Paik describes a method of identifying shapes that indicate potential malignant candidates by analysis of a digital or computerized image such as a CT, an MRI, a digitized X-ray, or any other medical image application that could be converted or rendered to a digital image. Accordingly, and for at least the reasons set forth above, Claim 20 is submitted to be patentable over Paik.

For at least the reasons above, Applicants respectfully request the § 102 rejection of Claims 12 and 20 be withdrawn.

The rejection of Claims 7, 12, 13, 20, 21, and 24 under 35 U.S.C. § 102(b) as being anticipated by Gur et al. (U.S. Patent No. 5,838,815) "Gur" is respectfully traversed.

Gur describes a method of detecting abnormal regions in a digital radiograph that includes for each identified suspected abnormal region, extracting multiple topographic layers of the region from the digital radiograph, determining features of the region in each of the layers, and applying inter-layer multivariate non-linear criteria to the features to determine whether the suspected abnormal region is to be classified as an abnormal region. The method includes a rule-setting phase wherein a CAD scheme is optimized using a database of known images and a use or application phase wherein new images are analyzed by the CAD scheme.

Claim 7 recites a method for detecting an anomaly including "performing a computed tomography (CT) volumetric scan to acquire CT data...generating at least one Digitally Reconstructed Radiograph (DRR) from the acquired CT data...providing the DRR to a radiographic computer aided detection (CAD) algorithm."

Gur does not describe nor suggest a method for detecting an anomaly as recited in Claim 7. Specifically, Gur does not describe nor suggest generating at least one Digitally Reconstructed Radiograph (DRR) from acquired CT data and providing the DRR to a

radiographic computer aided detection (CAD) algorithm. Rather, in contrast to the present invention, Gur describes a method of detecting abnormal regions in a digital radiograph wherein the method includes a rule-setting phase where a CAD scheme is optimized using a database of known images and an application phase wherein new images are analyzed by the CAD scheme. Accordingly, and for at least the reasons set forth above, Claim 7 is submitted to be patentable over Gur.

Claim 12 recites a Computed Tomography system including "an x-ray source, an x-ray detector, and a computer operationally coupled to said x-ray source and said detector, said computer configured to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a first CT scan of an object."

Gur does not describe nor suggest a Computed Tomography system as recited in Claim 12. Specifically, Gur does not describe nor suggest a computer configured to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a first CT scan of an object. Rather, in contrast to the present invention, Gur describes a method of detecting abnormal regions in a digital radiograph wherein the method includes a rule-setting phase where a CAD scheme is optimized using a database of known images and an application phase wherein new images are analyzed by the CAD scheme. Accordingly, and for at least the reasons set forth above, Claim 12 is submitted to be patentable over Gur.

Claim 13 depends from independent Claim 12. When the recitations of Claim 13 are considered in combination with the recitations of Claim 12, Applicants submit that dependent Claim 13 likewise are patentable over Gur.

Claim 20 recites a "computer readable medium encoded with a program configured to instruct a computer to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a CT scan of an object."

Gur does not describe nor suggest computer readable medium encoded with a program configured to instruct a computer to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a CT scan of an object as recited in Claim 20. Specifically, Gur does not describe nor suggest executing a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a CT scan of an object. Rather, in contrast to the present invention, Gur describes a method of detecting abnormal regions in a digital radiograph wherein the method includes a rule-setting phase where a CAD scheme is optimized using a database of known images and an application phase wherein new images are analyzed by the CAD scheme. Accordingly, and for at least the reasons set forth above, Claim 20 is submitted to be patentable over Gur.

Claim 21 recites a method of displaying data including "obtaining an x-ray projection image...supplying the obtained x-ray projection image to a computer aided detection (CAD) algorithm...displaying results of the CAD algorithm on at least one of a Computed Tomography (CT) scout image and a Digitally Reconstructed Radiograph (DRR)."

Gur does not describe nor suggest a method of displaying data as recited in Claim 21. Specifically, Gur does not describe nor suggest supplying an obtained x-ray projection image to a computer aided detection (CAD) algorithm and displaying results of the CAD algorithm on at least one of a Computed Tomography (CT) scout image and a Digitally Reconstructed Radiograph (DRR). Rather, in contrast to the present invention, Gur describes a method of detecting abnormal regions in a digital radiograph wherein the method includes a rule-setting phase where a CAD scheme is optimized using a database of known images and an application phase wherein new images are analyzed by the CAD scheme. Accordingly, and for at least the reasons set forth above, Claim 21 is submitted to be patentable over Gur.

Claim 24 recites a method for detecting an anomaly including "performing a volumetric CT scan of an object...generating at least one digitally reconstructed radiograph (DRR) from the volumetric CT scan...supplying the DRR to a radiographic computer aided detection (CAD) algorithm."

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Gur does not describe nor suggest a method of displaying data as recited in Claim 24. Specifically, Gur does not describe nor suggest generating at least one digitally reconstructed radiograph (DRR) from the volumetric CT scan and supplying the DRR to a radiographic computer aided detection (CAD) algorithm. Rather, in contrast to the present invention, Gur describes a method of detecting abnormal regions in a digital radiograph wherein the method includes a rule-setting phase where a CAD scheme is optimized using a database of known images and an application phase wherein new images are analyzed by the CAD scheme. Accordingly, and for at least the reasons set forth above, Claim 24 is submitted to be patentable over Gur.

For at least the reasons above, Applicants respectfully request the § 102 rejection of Claims 7, 12, 13, 20, 21, and 24 be withdrawn.

The rejection of Claims 8, 9, 16, 25, and 26 under 35 U.S.C. § 103(a) as being unpatentable over Gur et al. (U.S. Patent No. 5,838,815) "Gur" is respectfully traversed.

Gur is described above. Preliminarily, Applicants respectfully traverse the assertion in the Office Action that Gur et al. shows all of the features of the instant invention as shown above, except that Gur et al. is silent on the displaying of the CAD results mapped onto, registered with, or simultaneously with the CT or DRR images." Applicants agree that Gur is silent on the displaying of the CAD results mapped onto, registered with, or simultaneously with the CT or DRR images. However, Applicants traverse the assertion in the Office Action that it would have been obvious to one of ordinary skill in the art at the time of the instant invention to acquire an x-ray projection image and map the DRR and results from the radiographic CAD algorithm onto an x-ray projection space.

Applicant respectfully submits that the Section 103 rejection of the presently pending claim is not a proper rejection. As is well established, the mere assertion that it would have been obvious to one of ordinary skill in the art at the time of the instant invention to map, register, or simultaneously display the CAD results and the CT or DRR images motivated by the desire to distinctly point out the suspected anomalies to the radiologist does not support a prima facia obvious rejection. Rather, each allegation of what would have been an obvious

matter of design choice must always be supported by citation to some reference work recognized as standard in the pertinent art and the Applicants given the opportunity to challenge the correctness of the assertion or the notoriety or repute of the cited reference. Applicants have not been provided with the citation to any reference supporting the modification of the Gur system as made in the rejection. The rejection, therefore, fails to provide the Applicants with a fair opportunity to respond to the rejection, and fails to provide the Applicants with the opportunity to challenge the correctness of the rejection.

Moreover, as is well established, obviousness cannot be established by modifying the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the modification. Gur do not describe nor suggest the claimed invention. Rather, the present Section 103 rejection appears to be based on a modification of teachings selected from a patent in an attempt to arrive at the claimed invention. Specifically Gur is cited for its alleged teaching of all of the features of the instant invention except for displaying of the CAD results mapped onto, registered with, or simultaneously with the CT or DRR images. Since there is no teaching or suggestion in the cited art for the claimed modification, the Section 103 rejection appears to be based on a hindsight reconstruction in which a disclosure has been modified in an attempt to deprecate the present invention. Of course, such a modification is impermissible, and for this reason alone, Applicant respectfully requests that the Section 103 rejection of Claims 8, 9, 16, 25, and 26 be withdrawn.

Further, and to the extent understood, Gur do not describe nor suggest the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited art. Claim 7 recites a method for detecting an anomaly including "performing a computed tomography (CT) volumetric scan to acquire CT data...generating at least one Digitally Reconstructed Radiograph (DRR) from the acquired CT data...providing the DRR to a radiographic computer aided detection (CAD) algorithm."

Gur does not describe nor suggest a method for detecting an anomaly as recited in Claim 7. Specifically, Gur does not describe nor suggest generating at least one Digitally Reconstructed Radiograph (DRR) from acquired CT data and providing the DRR to a

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radiographic computer aided detection (CAD) algorithm. Rather, in contrast to the present invention, Gur describes a method of detecting abnormal regions in a digital radiograph wherein the method includes a rule-setting phase where a CAD scheme is optimized using a database of known images and an application phase wherein new images are analyzed by the CAD scheme. Accordingly, and for at least the reasons set forth above, Claim 7 is submitted to be patentable over Gur.

Claims 8 and 9 depend from independent Claim 7. When the recitations of Claims 8 and 9 are considered in combination with the recitations of Claim 7, Applicants submit that dependent Claims 8 and 9 likewise are patentable over Gur.

Claim 12 recites a Computed Tomography system including "an x-ray source, an x-ray detector, and a computer operationally coupled to said x-ray source and said detector, said computer configured to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a first CT scan of an object."

Gur does not describe nor suggest a Computed Tomography system as recited in Claim 12. Specifically, Gur does not describe nor suggest a computer configured to execute a radiographic Computer Aided Detection (CAD) algorithm on Digitally Reconstructed Radiograph (DRR) data derived from a first CT scan of an object. Rather, in contrast to the present invention, Gur describes a method of detecting abnormal regions in a digital radiograph wherein the method includes a rule-setting phase where a CAD scheme is optimized using a database of known images and an application phase wherein new images are analyzed by the CAD scheme. Accordingly, and for at least the reasons set forth above, Claim 12 is submitted to be patentable over Gur.

Claim 16 depends from independent Claim 12. When the recitations of Claim 16 are considered in combination with the recitations of Claim 12, Applicants submit that dependent Claim 16 likewise is patentable over Gur

Claim 25 recites a method for detecting an anomaly including "performing a volumetric CT scan of an object to obtain CT data...registering results from a CAD algorithm regarding x-ray projection data of the object with the obtained CT data...displaying the registered x-ray projection data with the CT data."

Gur does not describe nor suggest a method for detecting an anomaly as recited in Claim 25. Specifically, Gur does not describe nor suggest a method including registering results from a CAD algorithm regarding x-ray projection data of the object with the obtained CT data, and displaying the registered x-ray projection data with the CT data. Rather, in contrast to the present invention, Gur describes a method of detecting abnormal regions in a digital radiograph wherein the method includes a rule-setting phase where a CAD scheme is optimized using a database of known images and an application phase wherein new images are analyzed by the CAD scheme. Accordingly, and for at least the reasons set forth above, Claim 25 is submitted to be patentable over Gur.

Claim 26 recites a method for detecting an anomaly including "obtaining an x-ray projection of an object...registering results from a CAD algorithm regarding CT data of the object with the obtained x-ray projection...displaying the registered CT data with the x-ray projection."

Gur does not describe nor suggest a method for detecting an anomaly as recited in Claim 26. Specifically, Gur does not describe nor suggest a method including registering results from a CAD algorithm regarding CT data of the object with the obtained x-ray projection and displaying the registered CT data with the x-ray projection ray coupled to the pre-formed reflector. Rather, in contrast to the present invention, Gur describes a method of detecting abnormal regions in a digital radiograph wherein the method includes a rule-setting phase where a CAD scheme is optimized using a database of known images and an application phase wherein new images are analyzed by the CAD scheme. Accordingly, and for at least the reasons set forth above, Claim 25 is submitted to be patentable over Gur.

For the reason set forth above, Applicant respectfully requests that the Section 103 rejection of Claims 8, 9, 16, 25, and 26 be withdrawn.

The objection to Claims 10, 11, 14, 15, 17-19, 22, and 23 as dependent upon rejected base claims is respectfully traversed. For the reasons set forth above, it is respectfully submitted that the respective base claims of Claims 10, 11, 14, 15, 17-19, 22, and 23 are patentable over the cited art. When the recitations of Claims 10, 11, 14, 15, 17-19, 22, and 23 are considered in combination with the recitations of their respective base claims, it is submitted that Claims 10, 11, 14, 15, 17-19, 22, and 23 are likewise patentable over the cited art. Applicants according request that the objection to Claims 10, 11, 14, 15, 17-19, 22, and 23 be withdrawn.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,
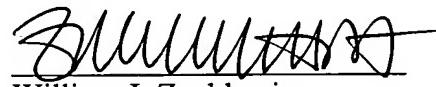
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